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PAPERS

IN

COLONIES AND TRADE.

COLONIES AND TRADE.

The following Communications on the production and application of Myrabolans, and their use as a substitute for Aleppo Galls, originated from the late Dr. Alexander Johnson, of Charlotte-Street, Portland-Place, who laid before the Society several other articles the products of the East Indies, with a view to the general advantage of Great Britain and her Colonies. Samples of the Myrabolans, and Specimens of the Colours they yield in dying, may be seen in the Repository of the Society.

On the 6th of February, 1793, Dr. Johnson laid before the Society samples of an article which he had received from Mr. Hellenus Scott, of Bombay, under the name of East-India Galls; the Committee to whose examination they were referred, found them to be the larger species of Myrabolans, and that they possessed many qualities similar to the Gall-Nuts of the Levant, both the pulp and outer bark striking a good black colour with Martial Vitriol. The following letter was afterwards sent by Dr. Johnson to the Secretary.

Charlotte-Street, Portland-Place.

SIR,

THE India nut Myrabolan, like our Walnut, contains its tinging quality only in its fruits or parenchymous part. Its astringent essence, far stronger than that of our Walnut, strikes a strong black colour with the feculæ of iron, and fine browns with weaker solutions of copperas, while with allum it makes buff colours and their class.

Unacquainted with the component parts of this nut, the tradesmen who were to use it required it to be coarsely ground, which, to satisfy them, was done, but proved wrong; on the one hand useless, and on the other loss of substance: a part of the fruit remaining on the grind-stones and clogging them, and another part became so adhesive to the broken shells and kernels, as scarcely to be disengaged from them by boiling.

From those and other circumstances, the idea arising that the fruity part alone was the useful, it became necessary to ascertain it by experiment. Three ounces of the nuts were therefore taken, put into an earthen pan, had warm soft water poured upon them, and with a slight cover were placed on the hobb of of a kitchen-range to stew. The evaporating water was replaced from a kettle usually upon that fire; and the next day, when examined and rubbed upon a board, the cover of the nut came easily off, leaving only some pulp adhesive to the shell, which then was put again into the pan, and stewed in the same manner as before. The greater part of the pulp came off in the water; but some still sticking fast, the nuts, with the clearest of the last water, were then thrown into a small tub, and therein rubbed with a hearth brush or small broom, until they became quite clean. They were then dried, and the next day bruised and broken, and set again to stew as before; the decoction became of a light brown: which colour it kept unaltered, notwithstanding a frequent addition of a solution of iron filings, and of copperas.

I am, SIR,

Your most obedient servant,

ALEXANDER JOHNSON.

Mr. CHARLES TAYLOR.

The Committee sent Samples of the article to several principal dyers and callico-printers in different parts of the kingdom, for their opinion of its quality: the answers to which were, that the Myrabolans possessed very strong astringent powers, and would be a very desirable substitute for Galls, if the price of them was moderate. The Committee, therefore, declared to the Society, that the Myrabolans would be useful in various manufactures, and serve as a good substitute for Galls. The Society finding that the Myrabolans, though the product of a British Colony, paid heavier duties on importation than Galls sent from Turkey, presented a memorial to the Lords of the Treasury, stating that the importation of this and other useful products of our Settlements, are in effect discouraged by being subject to high duties, while articles from foreign countries, possessing similar properties, are admitted on more favourable terms; and petitioning, that some steps might be taken to remove a discouragement so detrimental to the trade and manufactures of this country.

Although it does not appear that the petition of the Society has yet been complied with, there is reason to hope that so important a business will engage the attention of Government, and prevent large sums of money being sent to foreign states for similar articles.

The following is an abstract of a letter received by the Secretary, along with samples of two kinds of Myrabolans, in answer to an application made by him to Mr. William Pope, of Mahometpore, near Cassumbazer, in Bengal, for information on Myrabolans, and other products of India.

SIR,

I AM induced to send you the following articles, being part of those mentioned in your letter to Mr. Pope, on which you required information.

Myrabolans, or a specimen of dried fruit which I suppose to be the article described under the name of Myrabolans. The Bengal name for this fruit is Hurrah P'hul, the largest being called Burrah Hurrah, and the smallest Choota Hurrah. They are sold in the common Bazar; the large at one rupee and a half per maund, or 82lb. avoirdupoise, and the small at four rupees per maund.

They are of a very astringent quality, and much used by the natives of India in fixing colours. They are also used for giving a black dye to leather, which is done by mixing the powder of the larger sort with a certain proportion of iron filings and water.

The smaller kind, from every information which I have been able to procure, is more used in medicine than dying, although from the acid astringency of both kinds, their properties must be nearly the same.

I am, Sir,

Your obedient servant,

J. Machlachlan.

Council-House, Calcutta.

Mr. Charles Taylor.

⁂ From the different experiments laid before the Society, this conclusion may be drawn, that Myrabolans will furnish various shades of buff colours, ash, brown, and black, according to the mordants employed; that all the dyes from them are very permanent, and that they have the quality of giving a fullness and firmness to the goods dyed therewith.

Some hundred weights of them have been already used at Manchester, in stead of Galls, in the Turkey red-dye, and in other branches of business. The colouring matter of Myrabolans is easily extracted by boiling them, after they have been bruised in a mortar, without the trouble of separating the stone or kernel. In their common state and appearance, when imported, Myrabolans resemble dried plums, and are equal in value to half their weight of galls; but if the fruity or outer part could be sent from India in a dry state, without the stone or kernel, which is of little or no use, the article would be more valuable than Aleppo Galls.

June 4, 1801.

Five sorts of Myrabolans have been distinguished in the shops, all which have similar qualities; but the sort used in the above trials appears to be the fruit of the *Phyllanthus Emblica* of Linnæus, thus described, *Phyllanthus foliis pinnatis floriferis caule arboreo, fructu baccato.*

The SILVER MEDAL was this Session voted to ANDREW STEPHENS, Esq. of Keerpoy, in Bengal, for the following Communication on LAKE made by him from fresh STICK LACK, and sent to the Society with a quantity of the Lake, which is placed in their Repository.

Accounts of experiments made on this Lake by Dr. Bancroft are also annexed, which demonstrate that the Lake is a useful substitute for Cochineal in various cases, as may be seen from patterns of dyes prepared from it, and remaining for public inspection.

SIR,

AS Lake from the Stick-Lack just gathered from the trees, is an addition to the catalogue of dying-drugs, I consider it not unworthy the attention of the Society for the Encouragement of Arts, &c. and therefore beg leave to present a sample for their inspection, and humbly request they will be pleased to give it to some member of the Society experienced in the art of dying scarlet, to examine and report upon it.

I have reason to suppose that it is little inferior to Cochineal; and, as it may be afforded much cheaper, I hope it will be found a valuable article to the dyer.

But, should it even be found unequal to Cochineal, I am certain it will give a much better dye than can be obtained from Stick-Lack in England, as that article is liable to heat, and decay on the passage; and it suffers so much from age alone, that the dyers in Bengal cannot obtain colours so bright from Lack gathered only six or eight months, as they can from the fresh.

My situation is favourable for procuring the article. I have already delivered

18,000 lb. weight to the Company; but no accounts of sales, or any reports thereon, have as yet reached the Board of Trade here.

As the extracting the colouring matter from Lack, and sending it home in the form of Lake, may justly be considered as a useful invention, and has been declared by Dr. Bancroft to be a *desideratum*, it will not, I trust, be deemed presumption in me, to hope for some mark of approbation from a Society of Gentlemen to whom the manufactures of England are already so much indebted.

I am, Sir,

Your most obedient servant,

Andrew Stephens.

Assistant Surgeon, Bengal Establishment.

Keerpoy,
March 22, 1799.

To the Secretary of the
Society of Arts, &c.

The following letter from Dr. Bancroft to the Committee of Chemistry, was sent in answer to a request made by them on the 22d of February last. It states the natural history of Lacca, the mode of separating the colouring matter from it, and various methods of applying the colour for the purposes of Dyers; illustrated by specimens of woollen-cloth dyed by the Doctor, and which may be seen at the Society's Repository.

To the Committee of Chemistry of the Society of Arts, &c.

GENTLEMEN,

LACCA or Gum-lac is, as you doubtless know, produced abundantly by an insect of the Coccus genus, of which very satisfactory accounts have been given, first by Mr. James Kerr, in the Philosophical Transactions for the year 1781, and afterwards by Dr. Roxburgh,

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in those of the year 1791. These insects, when young, place themselves upon the succulent extremities of the branches of certain shrubs growing in different places, and more especially upon the uncultivated mountains on both sides of the Ganges, where they soon produce and involve themselves in a spissid sub-pellucid liquid, which seems to glue them to the branches where they are placed; and, by a gradual accumulation of this liquid, each insect acquires, and becomes inclosed in a perfect cell, where, at maturity it appears like a small oval red bag, without life, and full of a *beautiful red fluid.* The whole mass of these cells, and of the insects contained therein, while adhering externally to the sticks or branches in question, is called *stick* lac; but when detached from the sticks, and garbled, it takes the name of *seed* lac: and this last being boiled in water to separate the colouring matter, then strained, and formed into thin plates (while liquified by heat), becomes *shell* lac, and constitutes the principal part of sealing-wax, when well made.

Dr. Roxburgh found that these insects gave to water a much more *beautiful red colour* while fresh, than after being dried; and thence concluded that it might be well for persons living where lac is most abundant, to endeavour to extract the colouring-matter while fresh and moist, in such a manner as to render it capable of being afterwards preserved without injury.

About three years before the publication of Dr. Roxburgh's paper, I had received from Mr. P—, a gentleman who had lately returned to this country from India, a sample of colouring-matter, which he called East-India cochineal, and which very nearly resembled that of Mexico, when it has been reduced to powder. With this substance I made several experiments, which convinced me that it was the colouring matter of lac, extracted most probably by hot water, and precipitated by alum. Of these experiments I gave an account in the first volume of my publication, upon the Philosophy of Permanent Colours.

On the 7th of July, 1796, Mr. Fleming, Inspector of Drugs at Calcutta, wrote a letter to the Bengal Board of Trade, of which the following is an extract, viz.

" Dr. Bancroft, in a very instructive work, which he has lately published on the subject of Dying, mentions as a *desideratum*, a method of extracting the colouring matter of lac, and thinks that if it could be formed into Lake, and sent home in that state, it would be a far preferable method to that of sending the stick lac. Encouraged by so good an authority, I herewith send for your inspection two bottles of a preparation which I have received from Mr. Stephens, at Keerpoy, and which appeared to me to be exactly what the Doctor desires. Mr. Stephens informs me, that he prepared it from *fresh* lac, by a method discovered by himself; and that if it should be found to answer on trial, he will be able to provide a considerable quantity of it every year. I therefore beg leave to recommend that the accompanying sample may be sent home by the ship Dart, with a request to the Honourable Court of Directors, that it may be forwarded to Dr. Bancroft, for his opinion of its value," &c.

This recommendation the Board of Trade thought proper to adopt, and transmitted the same with the samples in question by the Dart, as appears by their letter of the 9th of July, 1796, to the Court of Directors, by whose order they were afterwards forwarded to me, for the purpose mentioned by Mr. Fleming. With these samples I made some successful experiments, and gave such an account of them, as, joined to the then high price of Cochineal, induced the East-India Company, as I have been informed, to purchase a considerable quantity of the Lake, or preparation in question, from Mr. Stephens, and at a very handsome price; though I believe few or no steps have been taken here to bring it into use among the Dyers, Morocco-leather manufacturers, Paper-stainers, &c.

Mr. Stephens having lately addressed the Society of Arts, &c. on the subject of this Lake, and sent them a sample of it, and I having been requested at a Committee of Chemistry, to whom Mr. Stephens's communication was referred, to repeat my experiments with a part of the sample sent to the Society, I have done so; and now beg leave to offer the Committee some specimens of colours dyed therewith, and an account of the means and process by which they were so dyed.

In the first volume of my publication on Permanent Colours, I have described and recommended a method of dying the scarlet colour from Cochineal upon a *new* principle; and this method has enabled me to produce a better scarlet with Mr. Stephens's Lake, than I have yet been able to do by the ordinary method. Perhaps my failures in this respect may be owing to a cause which I did not suspect until very lately, and the existence or non-existence of which I have not since had leisure to ascertain, though I hope soon to do it. In the mean time I shall endeavour as shortly as possible to enable the Committee to understand the nature and principle of the new method just mentioned. I had found, more than twelve years ago, that the *true* or *natural* colour of Cochineal when given to wool by dying, with the common solution, or nitro-muriate of tin, which the Dyers invariably employ for dying scarlet, was not a *scarlet*, but a bright a bright *rose* colour, as N° I. of the samples which accompany this paper; and that in the usual process it only became a scarlet from the chemical action of the acid of a considerable portion of tartar, which the Dyers invariably use; though without knowing the particular effect resulting from it.

N° II. is a sample of a very beautiful *scarlet*, dyed by the successor of the late Mr. Nash, in Gloucestershire, and like all *true* scarlets is a *compound* colour, of about three portions of the rose of N° I. and one portion of pure yellow; though in this instance the effect or colour results not from the addition of a *foreign yellow*, but from such a conversion of the cochineal rose colour towards the yellow, as is equivalent to about one fourth of the whole. Reflecting on this fact, and considering the great difference in price between the colouring-matter of Cochineal and that of the purest known *yellows*, I concluded that a great saving of expense might be obtained by employing the former without tartar, so as only to produce that portion, which is necessary, of the *rose* colour, and superadding a suitable portion of yellow from some of the cheaper yellow dying-drugs; among which the *quercitron-bark* naturally occurred to me as producing, with the solutions of tin, one of the purest and brightest yellow colours; of which a sample may be seen at N° III. Upon this principle the sample N° IV. has been dyed; by first giving the cloth a yellow ground, with a suitable quantity of the usual solution, or nitre-muriate of tin, and of the quercitron-bark, and then superadding the cochineal *rose* colour, by dying it in the usual way with cochineal, and a like solution of tin as for a scarlet; taking care only to *omit the tartar*, which would otherwise have carried the colour so much farther towards the *yellow hue* as to produce an *aurora*.

It is upon this principle that the samples N° V. and N° VI. have been dyed, from Mr. Stephens's *Lac-Lake.* Both were first dyed yellow, with the quercitron-bark, as at N° III. and afterwards dyed with the Lake: but for N° V. I employed, along with the Bark and Lake; a suitable portion of the solution of tin, commonly used by scarlet-dyers in the nitro-muriate of that metal: and for N° VI. I substituted the murio-sulphate, which I have in my first volume recommended as cheaper, and in some respects preferable, to the nitro-muriate of tin. I must, however, observe, that the colouring-matter of Mr. Stephens's Lake, having, as I believe, been precipitated by alum, cannot be disengaged from the aluminous earth, and dissolved even by boiling-water alone. Pure pot-ash, or pure soda, should be added in nearly an equal quantity to the Lake employed, in order to produce a complete separation, and solution of the colouring-matter,

matter; and the water should be made hot, and kept nearly at a boiling heat for half an hour; after which the clear liquor may be decanted from the sediment.

It will be perceived that the samples N° V. and N° VI. are a little less vivid and beautiful than the Gloucestershire scarlet N° II. or that dyed, or rather compounded, from cochineal and quercitron-bark N° IV. But it is probable that the colours from Lac-Lake may prove rather more durable than those from cochineal, and in that way they may compensate for their little inferiority in brightness. It is difficult to measure the quantity or amount of the colouring-matter afforded by the Lac-Lake, with accuracy, in experiments made upon so small a scale as mine; but I think there is reason to conclude, that four pounds of the Lake will yield about as much colour as one pound of fine cochineal.

I have the honour to be, very respectfully,

GENTLEMEN,

Your most obedient servant,

EDWARD BANCROFT.

May 29, 1801.

P. S. Mr. Stephens has not explained the means or process employed by him to produce the Lake in question. I am, however, convinced, that after extracting the colouring-matter by hot water, he has precipitated it by alum; which appears to me not to be the most eligible method of obtaining what is wanted from the Lac.

Probably the colouring-matter might be more advantageously procured by extracting it with the help of boiling-water, and afterwards evaporating the decoction to complete dryness, in the ways, and with the precautions, usually employed for the like purposes. But if it should be found expedient to employ any means of precipitation, I think some of the solutions of tin, which have been found suitable for dying scarlet, would prove more efficacious than alum in this way; because the calx of tin is of greater specific gravity than alumine: and it would moreover prove advantageous to the scarlet dye, because, by adding any suitable acid, this calx, and the colouring-matter precipitated by it, might be redissolved in a state fit for *immediate use*, without the necessity, which now exists, of employing an alkali, to detach the colouring-matter from the aluminous precipitant; and also without the danger of redissolving a portion of alumine along with the colouring-matter of the Lac, by which the scarlet might probably be rendered less vivid than it would be with a basis obtained wholly from tin.

⁂ Experiments made by other persons confirm Dr. Bancroft's observations. It appears that the effects of this Lake for dying cotton-cloth, staining leather, and printing upon paper, are analogous to those of cochineal, but require three or four times the weight, to produce similar intensity of colour.

The price of the article is such as will probably bring this Lake into general use, among Painters, Manufacturers, Printers, and Dyers.